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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/796,183	03/10/2004	Tomohiro Saito	04329.3265	2731

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EXAMINER

QUACH, TUAN N

ART UNIT PAPER NUMBER

2826

MAIL DATE DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/796,183	Applicant(s) SAITO, TOMOHIRO	
	Examiner Tuan Quach	Art Unit 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9, 12 and 14-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-8 and 14-20 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9 and 12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 March 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____ **Tuan Quach**
- 5) ☐ Notice of Informal Patent Application **Examiner**
- 6) ☐ Other: _____

DETAILED ACTION

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 9 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hu taken with Inaba et al.

Re claim 9, Hu (6,413,802 B1) teaches a semiconductor device comprising a silicon fin layer 14 on a silicon substrate 10, mask layer 16 on the silicon fin layer, gate insulating film (column 3 line 56) and gate 20 (column 4 lines 1-3) on the side surfaces of the fin silicon layer and the mask, first impurity regions (source/drain, column 4 lines 20-31) part from the region under the gate, and second impurity regions, e.g., LDD column 4 line 6, as well as angled and shallow implant region, e.g., column 4 lines 26, between the first impurity regions and the region under the gate. See Figs. 2c-2F,

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column 3 line 3 to column 4 line 65. Re the limitation regarding the first impurity regions or source/drain regions being higher than the second impurity regions, e.g., LDD regions, the impurity concentration of the source/drain being higher than LDD regions would have been met or otherwise would have been obvious given the light implant in the implant for the LDD region; see also column 4 lines 23-25. re claim 12, gate material of metal is taught, column 3 line 63; alternative material of metal silicide is well known and is encompassed in material delineated, column 3 line 63 or otherwise would have been notoriously conventional and obvious. Alternatively, official notice is given regarding such conventional use. Hu as applied above thus lacks primarily the explicitly teaching of the width of the second impurity region with regard to the thickness of the mask material but Hu is not limited to a particular thickness and thus does not preclude the thickness of the mask to be smaller than the width of the lightly doped region or second impurity region.

Inaba et al. (6,525,403 B2), column 6 line 16 to column 9 line 23, teach silicon fin 11A on substrate 11 and insulating 22 between the gate 14 and top surface of the projection or silicon fin 11A can be made sufficiently thick so as not to allow the channel to be formed under usually used operating voltages. The punchthrough susceptibility, column 6 lines 50 to column 7 line 9, that is due to the top surface of silicon fin layer 11A being made channel as opposed to only the side surfaces of the fin layer) thus can be obviated.

It would have been obvious to one skilled in the art in practicing the Hu invention to have employed the mask on the silicon fin or projection portion of sufficient thickness

as suggested by Inaba et al. to prevent formation of channel at the top surface of the fin or projection thereby preventing the occurrence of punch-through between source and drain region. It would follow that the selection of width of the lightly doped region or second impurity region to be smaller than the thickness of the mask permit such device width to be minimized while insuring the punchthrough problem is obviated. Such selection and optimization would have been further obvious given that Hu is not limited to a particular thickness, is not precluded from and thus encompassing the use of the thickness of the mask to be smaller than the width of the lightly doped region or second impurity region.

Applicant's arguments with respect to claims 9 and 12 have been considered but are moot in view of the new ground(s) of rejection.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner Tuan Quach whose telephone number is 571-272-1717. The examiner can normally be reached on M-F from 8:30 AM to 4:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor Sue Purvis can be reached on 571-272-1236. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Tuan Quach
Primary Examiner